WHAT IS CLAIMED IS:

1.   An image processing apparatus, named extended ε -filter, comprising:

an input section for receiving an input image;

a calculation section for calculating the small-amplitude variation component of the input image;

a signal processing section for adding the output of the calculation section to the input signal to provide a wrinkle enhanced image, and for subtracting it from the input signal to provide a smooth skin image; and

an output section for outputting both of the wrinkle enhanced image and the smooth skin image, or outputting either of the wrinkle enhanced or the smooth skin image according to the instruction from a correction instruction section.

2.   The image processing apparatus as claimed in claim 1, wherein the calculation section calculates the small-amplitude variation component of the input image according to the second term of an expression (1) which is expressed by:

$$y(m, n) = x(m, n) - \sum_i \sum_j a_{i,j} \cdot F\big(x(m, n) - x(m + i, n + j)\big),$$

where

y(m,n) is the output image;

x(m,n) is the input image;

$a_{i.j}$ is a weight coefficient; and

F(x) is a nonlinear function, in which F(x)=0 when $|X| > \varepsilon_0$.

3.   An image processing apparatus comprising primary and secondary ε-filter blocks and an addition section:

a primary ε-filter block including:

an input section for receiving an input image;

a calculation section for calculating the small-amplitude variation component of the input image by a small ε value, given as ε h;

a subtracting section for subtracting the small-amplitude variation component from the input image to provide a smooth skin image;

and an output section for outputting the smooth skin image;

a secondary ε-filter block including:

an input section for receiving the input image;

a   calculation   section   for   calculating   the minute-amplitude variation component of the input image by a minute ε value given as ε l less than ε h;

and an output section for outputting the minute-amplitude variation component; and

the addition section for adding the output of the secondary

ε-filter block to the output of the primary block to obtain the natural looking "smooth skin" image preserving the grain and texture of the skin.

4. An image processing apparatus comprising an extended ε-filter block, an ordinary ε-filter block and a minute amplitude component adjustment section,

the extended ε-filter block, including:

an input section for receiving an input image;

a calculation section for calculating the small-amplitude variation component of the input image by a small ε value, given as ε h ;

a signal processing section for adding the output of the calculation section to the input signal to provide a wrinkle enhanced image, and for subtracting it from the input signal to provide a smooth skin image; and

an output section for outputting either of the wrinkle enhanced or the smooth skin image according to the instruction from a correction instruction section;

the second ordinary ε-filter including:

an input section for receiving the input image;

a calculation section for calculating the minute-amplitude variation component of the input image by a minute ε value given as ε l less than ε h;

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and an output section for outputting the minute-amplitude variation component; and

a minute amplitude component adjustment section for adding or subtracting the secondary block's output to or from the primary block's output according to the correction instruction in order to obtain the natural looking smooth or wrinkle enhanced skin image with the grain and texture of a skin held in an original state.

5.   An image processing apparatus getting arbitrarily two amplitude values as parameters, comprising:

an input section for receiving an input signal;

a calculation section for calculating selectively the variation component having the amplitude between the 2 amplitude values given as βh and βl from the input signal;

a signal processing section for adding or subtracting the variation component to or from the input signal according to the instruction from the correction instruction section in order to obtain the natural looking smooth or wrinkle enhanced skin image with the grain and texture of a skin held in an original state; and

an output section for outputting both of the smooth skin and the wrinkle enhanced image, or outputting either of them according to the instruction.